REMARKS

The Office Action mailed on July 2, 2002 and the references cited therewith have been reviewed. Claims 1-22 are pending in this application.

Specification

In the Office Action, the specification was objected to due to an informality on page 4, line 16. Page 4, line 16, of the specification has been amended as suggested in the Office Action. Therefore, it is respectfully requested that this objection be withdrawn.

Claim Rejections - 35 U.S.C. § 112

In the Office Action, claim 21 was rejected under 35 U.S.C. § 112, first paragraph. Applicant has amended claim 21 to fix the typographical error therein. Claim 21, as amended, recites "an additional demultiplexer coupled to *an input* of each of the first stage demultiplexers." Thus, it is respectfully requested that this rejection be withdrawn.

Claim Rejections - 35 U.S.C. §103

In the Office Action, claims 1 and 2 were rejected under 35 U.S.C. 103(a) as being unpatentable over Dail (U.S. Patent No. 5,765,097) in view of Wala (U.S. Patent No. 6,112,086) in further view of Beveridge (U.S. Patent No. 5,469,495) (referred to here as "Beveridge '495"). Respectfully, Applicant traverses this rejection.

Claim 1 is directed to a hybrid fiber/coax network. The network includes a head end, at least one optical distribution node coupled to the head end over at least one fiber optic link, and a plurality of coaxial cable links coupled to each of the at least one optical distribution node. A transmitter, disposed at the optical distribution node, that is

responsive to signals from the plurality of coaxial cable links, converts analog signals to baseband digital signals and transmits the baseband digital signals to the head end over the at least one optical link. A receiver is disposed at the head end. The receiver is responsive to the baseband digital signals from the transmitter and converts the digital signals to analog signals for the head end.

None of the references, alone or in combination, teach or suggest the network of claim 1. The Office Action admits that Dail does not disclose that the electrical signals are analog, that the optical signals are baseband digital signals, and that the receiver on the head end converts the optical signal back to an electrical signal. The Office Action proposes a combination of Dail with Wala and Beveridge '495. Applicant respectfully traverses the motivation for the proposed combination. The Office Action asserts that Wala and Beveridge '495 teach using an optical link to pass digital signals converted from analog signals. None of the cited passages of Wala and Beveridge '495, however, relate to the use of a fiber optic link in a hybrid fiber/coax (HFC) network. The cited portion of Wala is from a discussion of a cellular phone system. The cited portion of Beveridge '495 is from a discussion of a telephone network. More specifically, the "baseband digital transmission system" described in the cited portion of Beveridge '495 is that part of the telephone network that couples a first central office to a second central office, not the part of the network that couples a central office to subscribers. *See, e.g.,* Beveridge '495, col. 2, lines 7-11. In the cited portion of Beveridge '495, the part of the network that couples central office to subscribers uses copper telephone lines. *See, e.g.,* Beveridge '495, col. 2, lines 4-6 and 18-22. Furthermore, Beveridge '495 teaches away from the proposed combination in its discussion of a preferred embodiment of "a hybrid fiber/coax transport architecture." Specifically, Beveridge '495 teaches that "[t]he telephony signals must be modulated to be transported on *the analog passband fiber optic cable* 14." *See* Beveridge '495, col. 10, lines 63-65. Therefore, it is respectfully

submitted that one of ordinary skill in the art would not be motivated to make the proposed combination.

Moreover, Applicant respectfully traverses the statement made in the Office Action that "[w]avelength division multiplexing is more complicated than sending baseband digital signals, so it would have been obvious to use baseband signaling because the system is not receiving return signals on the fiber optic line." *See* Office Action, paragraph 7. The system in Dail is a bi-directional system "for transmission of video information from a head end to one or more subscribers and for transmitting information from each subscriber to the head end." *See, e.g.,* Dail, col 2, lines 34-38. The Office Action provides no basis for modifying the system disclosed in Dail to not receive downstream signals on the fiber optic line. Indeed, Dail, Wala, and Beveridge '495 all disclose bi-directional systems in which both upstream and downstream traffic travels on the communication line. *See, e.g.,* Dail, col 2, lines 34-38, Office Action, paragraph 7 ("Wala uses one cable to both receive and transmit signals."), Beveridge '495, col. 10, line 67 – col. 11, lines 3. It is respectfully submitted that the proposed modification of Wala is improper.

Therefore, based on the foregoing arguments, it is submitted that claim 1 is not obvious in light of the cited art and is allowable.

Claim 2 depends from claim 1 and is likewise allowable for at least the reasons set forth above with respect to claim 1.

Claim 3 was rejected under 35 U.S.C. 103(a) as being unpatentable over Dail in view of Wala and Beveridge '495 as applied to claim 1, and further in view of Radice (U.S. Patent No. 5,138,440). Applicant respectfully traverses this rejection.

Claim 3 depends from claim 1 and is likewise allowable for at least the reasons set forth above with respect to claim 1.

Claim 4 was rejected under 35 U.S.C. 103(a) as being unpatentable over Dail in view of Wala and Beveridge '495 as applied to claim 1, and further in view of Hoffart (U.S. Patent No. 5,341,216) and Radice. Applicant respectfully traverses this rejection.

Claim 4 depends from claim 1 and is likewise allowable for at least the reasons set forth above with respect to claim 1.

Claim 5 was rejected under 35 U.S.C. 103(a) as being unpatentable over Dail in view of Wala and Beveridge '495 as applied to claim 1, and further in view of Phillips et al. (U.S. Patent No. 5,872,810) and Radice. Applicant respectfully traverses this rejection.

Claim 5 depends from claim 1 and is likewise allowable for at least the reasons set forth above with respect to claim 1.

Claim 6 was rejected under 35 U.S.C. 103(a) as being unpatentable over Dail in view of Wala and Beveridge '495 as applied to claim 1, and further in view of Petroff (U.S. Patent No. 5,198,989). Applicant respectfully traverses this rejection.

Claim 6 depends from claim 1 and is likewise allowable for at least the reasons set forth above with respect to claim 1.

Claims 7 and 9 were rejected under 35 U.S.C. 103(a) as being unpatentable over Dail in view of Wala in further view of Beveridge '495 and Vander Mey (U.S. Patent No. 5,777,544). Applicant respectfully traverses these rejections.

Claim 7 is directed to a transmitter for an optical distribution node. The transmitter includes at least one bandpass filter that is operable to select a portion of the frequency spectrum that is associated with return paths signals for a hybrid fiber/coax network. The transmitter also includes at least one analog to digital converter, responsive to the at least one bandpass filter, that creates baseband digital data from the return path signals. The transmitter further includes at least one multiplexer, responsive to the at least one analog to digital converter, that creates a serial data stream from the baseband digital data from the at least one analog to digital converter and an optical

transmitter, responsive to the at least one multiplexer, that is operable to transmit the serial data to a head end as a digital baseband signal.

None of the cited references, either alone or in combination, teach or suggest the transmitter of claim 7. Dail fails to disclose an optical transmitter, responsive to the at least one multiplexer, that is operable to transmit the serial data *to a head end as a digital baseband signal*, as is recited in claim 7. The Office Action states that "Beveridge also teaches the use of baseband digital signals." *See* Office Action, paragraph 19. It is respectfully submitted that, for the reasons set forth above in connection with claim 1, such a combination is improper and would not result in the transmitter of claim 7. The cited portions of Wala and Beveridge '495 do not relate to return path signals for a hybrid fiber/coax network. Also, Beveridge '495, in its discussion of a preferred embodiment of a hybrid fiber/coax transport architecture, teaches away from the proposed combination by teaching that upstream transmissions in a hybrid fiber/coax transport from fiber node 18 should be analog. *See, e.g.,* Beveridge '495, col. 10, lines 63-65. Thus, one of ordinary skill in the art would not be motivated to modify Dail as proposed in the Office Action.

Moreover, the Office Action admits that Dail fails to disclose a transmitter having at least one multiplexer, responsive to the at least one analog to digital converter, that creates a serial data stream from the baseband digital data. *See* Office Action, paragraph 19. The Office Action takes the position that Beveridge '495 teaches the use of baseband digital signals and of using a multiplexer to combine multiple signals into one transmitted stream. The Office Action also states that it is implicit that this is done for efficient use of the communications line. *See* Office Action, paragraph 19. Applicant respectfully traverses the stated motivation for such a modification of Dail. The fiber node 18 of Dail already includes functionality that combines multiples signals into a single signal. *See, e.g.,* Dail, col. 4, lines 19-27, col. 9, lines 41-51. As a result, one skilled in the art would not be motivated to modify Dail as proposed "for efficient

use of the communications line" since Dail already combines multiple signals into a single signal.

Therefore, based on the foregoing arguments, it is submitted that claim 7 is not obvious in light of the cited art and is allowable.

Claim 9 depends from claim 7 and is likewise allowable for at least the reasons set forth above with respect to claim 7.

Claim 8 was rejected under 35 U.S.C. 103(a) as being unpatentable over Dail in view of Wala, Beveridge '495, and Vander Mey as applied to claim 7, and further in view of Heiling (U.S. Patent No. 5,136,410), Hoffart, and Radice. Applicant respectfully traverses this rejection.

Claim 8 depends from claim 7 and is likewise allowable for at least the reasons set forth above with respect to claim 7.

Claim 10 was rejected under 35 U.S.C. 103(a) as being unpatentable over Dail in view of Wala, Beveridge '495, and Vander Mey as applied to claim 7, and further in view of Radice. Applicant respectfully traverses this rejection.

Claim 10 depends from claim 7 and is likewise allowable for at least the reasons set forth above with respect to claim 7.

Claim 11 was rejected under 35 U.S.C. 103(a) as being unpatentable over Dail in view of Wala, Beveridge '495, and Vander Mey as applied to claim 7, and further in view of Ferris (U.S. Patent No. 3,931,473). Applicant respectfully traverses this rejection.

Claim 11 depends from claim 7 and is likewise allowable for at least the reasons set forth above with respect to claim 7.

Claim 12 was rejected under 35 U.S.C. 103(a) as being unpatentable over Dail in view of Wala, Beveridge '495, and Vander Mey as applied to claim 7, and further in view of Phillips et al. and Radice. Applicant respectfully traverses this rejection.

Claim 12 depends from claim 7 and is likewise allowable for at least the reasons set forth above with respect to claim 7.

Claims 13, 14, and 17 were rejected under 35 U.S.C. 103(a) as being unpatentable over Dail in view of Wala in view of Beveridge '495 and Farhan (U.S. Patent No. 6,356,369). Applicant respectfully traverses this rejection.

Claim 13 is directed to a method for processing data in a return path of a hybrid fiber/coax network. The method includes receiving analog, upstream data at an optical distribution node and generating baseband digital data from the analog, upstream data. The method also includes creating a serial data stream including the digital data and driving a digital laser to transmit the digital data in a baseband digital format to a head end of a network.

The Office Action admits that the Dail fails to disclose driving a laser to transmit the digital data in a baseband digital format to a head end of the network. *See* Office Action, paragraph 31. The Office Action takes the position that Beveridge '495 teaches the use of baseband digital signals. Applicant respectfully submits that one of ordinary skill in the art would have no motivation to combine the cited references as proposed in the Office Action. The cited portions of Beveridge '495 regarding baseband digital signals do not relate to a hybrid fiber/coax network. Moreover, in discussing a preferred embodiment of a hybrid fiber/coax transport architecture, Beveridge '495 teaches away from the proposed combination. *See, e.g.,* Beveridge '495, col. 10, lines 63-65. Fahran also teaches away from the proposed combination. Fahran describes a system that transmits return path signals using wave division multiplexing. *See, e.g.,* Fahran, col. 4, line 67 – col.5 line 11. Therefore, one of ordinary skill in the art would have no motivation to make the combination of the cited references proposed in the Office Action.

Therefore, based on the foregoing arguments, it is submitted that claim 13 is not obvious in light of the cited art and is allowable.

Claims 14 and 17 depend from claim 13 and are likewise allowable for at least the reasons set forth above with respect to claim 13.

Claims 15 and 16 were rejected under 35 U.S.C. 103(a) as being unpatentable over Dail in view of Wala in view of Beveridge '495 and Farhan as applied to claim 13 above, and further in view of Radice. Applicant respectfully traverses this rejection.

Claims 15 and 16 depend from claim 13 and are likewise allowable for at least the reasons set forth above with respect to claim 13.

Claim 18 was rejected under 35 U.S.C. 103(a) as being unpatentable over Beveridge (U.S. Patent No. 5,440,335) (referred to here as "Beveridge '335") in view of Tsutsui (U.S. Patent No. 5,680,130). Applicant respectfully traverses this rejection.

Claim 18 is directed to a receiver for a digital data return path of a head end in a hybrid fiber/coax network. The receiver includes an optical receiver that is operable to receive a serial, digital baseband signal from an optical link. The receiver also includes at least one demultiplexer, responsive to the optical receiver, that demultiplexes the digital baseband signal. The receiver further includes at least one digital to analog converter, responsive to the at least one demultiplexer, that creates analog signals for the head end and at least one filter that is operable to compensate for quantization effects in the frequency spectrum that is associated with return path signals for a hybrid fiber/coax network.

None of the cited references, either alone or in combination, disclose a receiver having at least one digital to analog converter, responsive to the at least one demultiplexer, that creates analog signals for the head end. The Office Action takes the position that a receiver disclosed in Beveridge '335 has at least one digital to analog converter that creates analog signals for the head end. *See* Office Action, paragraph 37. However, the portion of Beveridge '335 cited for support of this assertion (column 2, lines 20-24) discusses the processing of *downstream* signals for transmission to subscribers in a conventional, public switched telephone network. The cited portion do

not relate to a hybrid fiber/coax network. Instead, the cited portion of Beveridge '335 discusses how an upstream analog signal from a copper telephone line is received at a first central office. The analog signal is converted to a digital form for transmission to a second central office. At the second central office, the signal is converted to an analog form for transmission downstream to a second telephone set. *See* Beveridge '335, col. 2 lines 1-24, especially, col. 2, lines 20-24 ("As the original talker's signal reaches the other switching office involved on the call, it is converted back to the original analog form and put on the copper pair connected to the far-end telephone set, once again in baseband."). Therefore, the analog-to-digital conversion referred to in the cited portion of Beveridge '335 occurs in the *downstream path* and does not create analog signals "for the head end," as recited in claim 18, but creates analog signals for transmission downstream to a second telephone set.

Moreover, Applicant respectfully submits that one of ordinary skill in the art would have no motivation to modify any receiver referred to in the cited portions of Beveridge '335 in the manner proposed in the Office Action. The Office Action admits that the cited portion of Beveridge '335 does not disclose a filter that is operable to compensate for the quantization effects in the frequency spectrum that is associated with return path signals for a hybrid fiber/coax network. *See* Office Action, paragraph 37. The Office Action takes the position that Tsutsui teaches the use of a filter to compensate for quantization effects. The Office Action reasoned that it would have been obvious to one of ordinary skill in the art of receivers to include a filter to get rid of unwanted quantization noise in the incoming signal.

As noted above, the cited portion of Beveridge '335 relates to a telephone network. Even assuming for the sake of argument that one of ordinary skill in the art would be motivated to use a filter to "get rid of unwanted noise in the incoming signal," one of ordinary skill in the art would not use a filter operable to compensate for the quantization effects in the frequency spectrum that is associated with return path signals

for a hybrid fiber/coax network. The cited portions of Beveridge '335 are unrelated to a hybrid fiber/coax network. Applicant respectfully submits that one of ordinary skill in the art would not make modifications suitable for use in a hybrid fiber/coax network when such modifications are not going to be used in an HFC network. Moreover, any digital-to-analog conversion occurring in the cited portions of Beveridge '335 occurs in the downstream path, not in an upstream ("return") path. Thus, one of ordinary skill in the art would not make modifications suitable for use in return path (upstream) processing when such modifications are not going to be used in a return path.

Therefore, based on the foregoing arguments, it is submitted that claim 18 is not obvious in light of the cited art and is allowable.

Claim 19 was rejected under 35 U.S.C. 103(a) as being unpatentable over Beveridge '335 in view of Tsutsui as applied to claim 18 and further in view of Heiling (U.S. Patent No. 5,136,410), Hoffart, and Radice. Applicant respectfully traverses this rejection.

Claim 19 depends from claim 18 and is likewise allowable for at least the reasons set forth above with respect to claim 18.

Claim 20 was rejected under 35 U.S.C. 103(a) as being unpatentable over Beveridge '335 in view of Tsutsui as applied to claim 18 and further in view of and Radice. Applicant respectfully traverses this rejection.

Claim 20 depends from claim 18 and is likewise allowable for at least the reasons set forth above with respect to claim 18.

Claim 21 was rejected under 35 U.S.C. 103(a) as being unpatentable over Beveridge '335 in view of Tsutsui as applied to claim 18 and further in view of Ferris and Brouard et al. (U.S. Patent No. 4,244,046). Applicant respectfully traverses this rejection.

Claim 21 depends from claim 18 and is likewise allowable for at least the reasons set forth above with respect to claim 18.

Claim 22 was rejected under 35 U.S.C. 103(a) as being unpatentable over Beveridge '335 in view of Tsutsui as applied to claim 18 and further in view of Phillips et al. and Radice. Applicant respectfully traverses this rejection.

Claim 22 depends from claim 18 and is likewise allowable for at least the reasons set forth above with respect to claim 18.

CONCLUSION

Claims 1-22 are currently pending. Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. If the Examiner has any questions or concerns regarding this application, please contact the undersigned at (612) 332-4720, ext. 226.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 502432.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION

Third Paragraph of Page 4:

The use of baseband, digital transmission in the upstream over optical link 105 provides several advantages over traditional analog transmission. For example, the performance of the return path over link 105 can be monitored in real time. This provides, among other advantages, the opportunity [to] for real-time analysis of data integrity, e.g., monitoring bit error rate link performance monitoring. Further, the field set-up of the optical distribution node is simplified over conventional approaches since issues related to, for example, complex balancing of tilt, level and average power in analog equipment to achieve optimum analog laser performance have been removed.

IN THE CLAIMS

21. (Amended) The receiver of claim 18, wherein the at least one demultiplexer comprises:

one first stage demultiplexer for each coaxial link associated with the receiver; and

an additional demultiplexer coupled to an input [the output] of each of the first stage demultiplexers.